

LIST OF EQUIPMENT

No.	Description	Quantity	
NITROGEN/HELIUM LEAK TESTING/PURGING			
42	90k 10,000 Psi Nitrogen Converter Pump	3	unit
43	180k 10,000 Psi Nitrogen Converter Pump	1	unit
44	Nitrogen Tank	5	unit
45	Gas Booster Pump	4	unit
46	Overpressure Protection Skid	4	unit
47	Mass Spectrometer	4	unit
48	Handheld Ultrasonic Leak Detector	2	unit
49	Test Cabin	2	unit
50	Pressure Gauges Set	20	unit
51	Pressure/Temperature Records Set	5	unit
52	Hoses	100	unit
53	Fittings	300	unit
54	Accessories/Maintenance	4	unit
55	AHP/Pneumatic Hydro-Test Pumps	4	unit
56	Poly Tank / Reserve Air	3	unit
57	Pressure / Temperature Recorders Set	2	unit
58	Pressure Gauges Set		
59	Accessories – Test Blinds, Gaskets for Various Sizes		
60	Bolting Tools as per bolting tools list of equipment		

EQUIPMENT

NITROGEN CONVERTER UNIT



90K 10,000 psi Nitrogen Pump

Maximum Flow Rate: 90,000 scf/hr/2.550 Nm³/hr
 Maximum Working Pressure: 10,000 psig/690 bar
 Dimension: L 3,910mm x W2,235mm x H2,210mm
 Fuel Capacity: 150 US Gallons / 570 Liters
 Gross Weight: 8,000 kg



180K 10,000 psi Nitrogen Pump

Maximum Flow Rate: 180,000 scf/hr/4700 Nm³/hr
 Maximum Working Pressure: 10,000 psig/690 bar
 Dimension: L4,570mm/180" x W2,438mm/96" x H2,590mm/102"
 Fuel Capacity: 375 Liters/100 US Gallons
 Gross Weight: 8,000 kg

NITROGEN TANK



2000 USG

Frame Dimension: 2991mm X 2468mm X 2591mm
 high
 Capacity: Gross – 2100 USG / 8000 liters,
 Net – 2000 USG / 7600 liters
 Working Pressure: 65 psi / 4.5 bar
 Test Pressure : 105 psi / 7.2 bar



5500 USG

Frame Dimension: 6058mm X 2438mm X 2591mm
 Capacity: Gross – 5412 us / 20485 liters
 Working Pressure: 250 psi / 17.24 bar
 Test Pressure: 343 psi / 23.7 bar

EQUIPMENT

90K 10,000 PSI NITROGEN PUMP



PERFORMANCE SPECIFICATION

- Maximum Working Pressure: 10,000 psig/ 690 bar
- Maximum Flow Rate: 90,000 scf/hr/ 2,550 Nm²/hr
- Hydrostatic Test Pressure: 15,000 psig/ 1035 bar
- Design Maximum Flow rate Temperature: 20 degC/70 degF
- Maximum Simultaneous Flow & Pressure: 90,000 scf/hr/2,300 Nm³/hr at 10,000 psi/690 bar
- Standard Design Ambient Temperature: +50degC
- Design Environments: Offshore / Tropical / Desert
- Gross Weight: Estimate 8,000 kg
- Dimension: L 3910mm x W 2235mm x H 2210mm
- Fuel Capacity: 150 US Gallons /570 liters

STANDARD FEATURES

- Outer 4 point lift frame designed in accordance with DNV 2.7-1 *Offshore Freight Containers Design and Certification*
- Forklift Pocket for yard handling
- Unit all fully tested prior to shipping/mobilization
- Safety non-slip material on all rugs and a harness point at the top of each ladder
- 500 BHP Zone 2 Diesel Engine: Detroit model 8V92TA
- Pyroban Zone 2 System: Exhaust Gas Cooling, clean cap type, Stainless Steel certified exhaust spark arrestors
- Hydraulic heat load system
- ACD 1.25" 10,000 psi cold ends 1.5" x 2.5" x 6" centrifugal boost pump
- 10,000 psi rated vaporizer pot
- Gearbox: Funk 2 pad hydraulic pump drive gearbox
- Start system: Ingersoll rand air starter motor model 150 BMG completed with starter lubrication via a Norgren water trap/lubricator F15 Series
- Air System: A 12 CFM compressor will be driven via the engine and will be supplied with an air intake filter and regulator. A cool Technology air receiver approximate volume 160 liters capacity
- Engine Safety and Shutdown System: Low lube Oil pressure, Engine over speed, High Coolant Temperature, GN2 Pump over speed, Emergency Shutdown and Engine/system safety devices panel

SPECIAL FEATURES

- All cryogenic piping to be Stainless Steel type 316 or 304
- Fuel and Hydraulic Tanks to be Stainless Steel
- Stainless Steel floor in all areas exposed to possible cryogenic spillage
- Cryogenic long stem ball valves for liquid nitrogen circuit
- Tempering line along nitrogen vaporizer to control the gaseous nitrogen discharge temperature
- Discharge relief valve set at 11,000 psi and a gas check valve for unit
- Engine to be equipped with air start system
- Cryogenic suction, boost pump bypass and return fittings to be 1.5' CGA
- Stainless Steel engine air inlet, engine exhaust pipe work and silencer
- Fully solder dipped core assembly radiator suitable for offshore use
- All moving part will be covered by appropriate guards and anti-static fan will be used



EQUIPMENT

170K 10,000 PSI NITROGEN PUMP



PERFORMANCE SPECIFICATION

- Maximum Working Pressure: 10,000 psig/ 690 bar
- Maximum Flow Rate: 170,000 scft/hr/ 4,467 Nm²/hr
- Hydrostatic Test Pressure: 15,000 psig/ 1035 bar
- Design Maximum Flow rate Temperature: 20 degC/70 degF
- Maximum Simultaneous Flow & Pressure: 170,000 scf/hr/4,467 Nm³/hr at 10,000 psi/690 bar
- Standard Design Ambient Temperature: +50degC
- Design Environments: Offshore / Tropical / Desert
- Gross Weight: Estimate 8,500 kg
- Dimension: L 4572mm x W 2438mm x H 2600mm
- Fuel Capacity: 100 US Gallons /378 liters

STANDARD FEATURES

- Skid and frame are designed and built to BS EN 12079, DNV certification 2.7-1.
- Upper frame is manufactured from 100mm x 100mm box section steel. Base section includes 300mm x 150mm on 200mm centers forklift pockets integral to the base skid
- Detroit 8V92N 384 BHP at 2100 rpm. Engine configuration includes dual exhaust gas heat exchangers to recover waste exhaust gas heat
- Solder dipped radiator
- Engine air inlet and engine exhaust pipe-work are stainless steel
- Stainless steel exhaust silencer
- Hazardous are engine protection package including: exhaust gas manifold cooler, air inlet flame trap, shutdown valve and exhaust spark arrestor
- Hydraulic heat load system
- The triplex pump drive is obtained using a Dension P 14 variable flow, high pressure piston hydraulic pump
- NP 200 power end
- Designed and built 15/8" cold end pumps DNV approved, 10,000 psi working pressure, 170,000 scf/h flow
- Designed and built 1-1/2" x 2-1/2" x 6" centrifugal charge pump
- Designed and built DNV approved high pressure vaporizer, used to convert the waste heat obtained from the power pack and hydraulic circuits to useful heat for liquid nitrogen conversion

SPECIAL FEATURES

- Cryogenic ball valves for the liquid nitrogen circuit
- Tempering line around the nitrogen vaporizer to control the gaseous nitrogen discharge temperature
- Stainless steel floor in all areas exposed to possible cryogenic spillage
- High pressure safety shut down system
- Discharge relief valve set at 11,000 psi and a gas line check valve for unit
- The control panel mounted on the end (or on the side) of the skid assembly
- Engine equipped with an air start system
- Cryogenic suction and return fittings 1-1/2" CGA (NIT150)
- Manually operated discharge valve is a 2 x 1 valve

EQUIPMENT SPECIFICATION

- Certified by DNV
- Skid mounted liquid nitrogen pumping and vaporizing system
- Designed and constructed for operation both onshore and offshore
- Engine designed to meet current requirements for engines for use in a Zone 2 area



EQUIPMENT



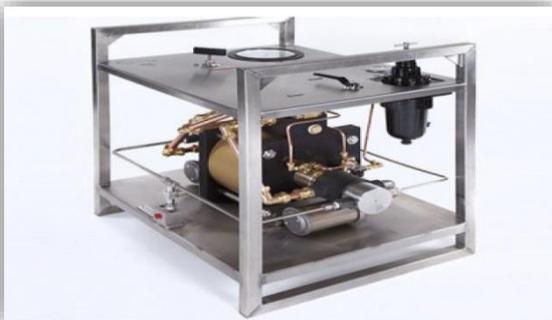
PORTABLE LEAK DETECTOR

Use to detect mass of Helium atom



MASS SPECTROMETER

Higher capability in detecting the leak rate than Portable Leak Detector



GAS BOOSTER PUMP

Can be used for pressure testing or for pre-charging accumulators and down hole tools.



OVER PRESSURE PROTECTION SKID (OPPS)

Safety Device That Connect to the Pump and Will Automatically shut down the Unit When it reaches its Pre-set Limit.